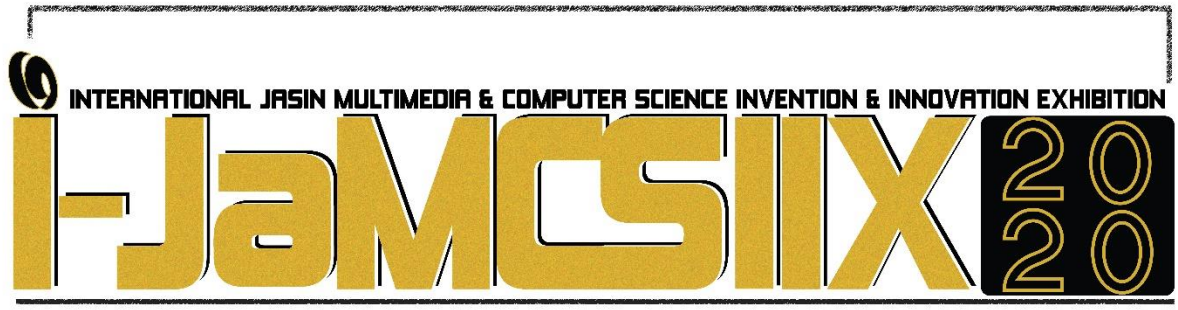

Phytochemical Screening, Total Phenolic Content and Antioxidant Activity of Leaves Extracts from *Mangifera indica* L. cv. Apple

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ABSTRACT

Mangifera indica L. cv. Apple *(*apple mango) is considered one of most important and economic crops of tropical fruits, it belongs to Anacardiaceae family which is cultivated worldwide as edible seeds and fruits, compound in medical, valuable timber and landscape interest. The purpose of this research was carried out to investigate the presence of phytochemical groups and antioxidant activity of the leaves of *Mangifera indica* L. cv. Apple. The extracts were found using maceration result and the phytochemicals were screened using various of chemicals tests. Total phenolic content (TPC) are important to measure the phenolic compounds in leaves extract as a potential of antioxidant activity. TPC was determined according to the Folin-Ciocalteau colorimetric method. The antioxidant activity was applied the 2,2-diphenyl-1-picrylhydrazyl radical scavenging capacity (DPPH) assay. Phytochemical screening on leaves of methanol extract revealed the presence of flavonoids, phenols, tannins, terpenoids, alkaloids, steroids, saponins, glycosides, coumarin and quinone. The methanol extracts of *M. indica* L. cv. Apple for leaves (4.427 mg GAE/g) were showed the highest TPC. The methanol extract of *M. indica* L. cv. Apple for leaves (64.80 µg/mL) significantly lower of DPPH radical scavenging activity IC_{50}. The result showed that *M. indica* L. cv. Apple for leaves plant is potent antioxidant property so they could be the rich source of natural antioxidants. This leaf of plant could be assigned as natural antioxidant and its be helpful to explore the biochemical profile and active compound identification in the field of pharmaceutical research.

KEYWORDS: *M.indica*, Anacardiaceae, phytochemical screening, antioxidant activity

1 INTRODUCTION

Apple mango is cultivar from *Mangifera indica* species that are originally located from coastline in Kenya and mostly in area of Malindi [1]. These fruits have greatly demand in export and import market especially in Kenya [2]. The entire fruit weight is about 397 g, diameter of length and width of fruit is 9.7 cm and 11 cm. Generally, the skin is smooth and thin, juicy yellow or white of flesh have excellent taste and texture where almost free from fiber. Also, Apple mango consists small or medium seed. The trees have simple leaves up to 0.3 m to 0.5 m length, leathery, glossy and colour turn to deep [3]. The fruit of Apple mango are composed essential sources which are vitamin A, C and folate, antioxidants, calcium, magnesium, phosphorus and potassium [4]. Plant parts have been used extensively to treat various ailment and has been proved to possess many biological activities such as antidiabetic, antioxidant, antimicrobial, radical scavenging and anti–inflammatory. *Mangifera* species are one of an abundant source of phenolics and flavanoids constituents. Therefore, the leaves of *M. indica* consists various classes of phytochemical constituents such as flavanoids, tannins, alkaloids, terpenoids, anthraquinones, saponins, cardiac glycosides and steroids [5]. The chemical compounds which are flavonoids and phenolic compounds that have a various of benefits as an antioxidant, hypo-allergenic, antidiabetic and anti-inflammatory [6]. The chemical compounds that act as antioxidant are phenolic compounds. That group of compounds are widely abundant in nature, especially in fruits and herbs that have ability to scavenging free radicals. DPPH method is a conventional method in testing the antioxidant. This method is a conventional method and has been used for determination of the activity of antioxidant compounds. With this background, present study was aimed to determine the phytochemicals and to evaluate the antioxidant activity is present from various extracts of *M. indica* L. cv leaves.

2 OBJECTIVES

The aim of this study was carried out to investigate the potential application of *M. indica* L. cv. Apple of leaves extracts by conducting the analysis on the phytochemical screening, total phenolic content (TPC) and the antioxidant properties of various solvent extracts (n-hexane, ethyl acetate and methanol).

3 SIGNIFICANCE(S)

This study can provide more information about phytochemical screening and antioxidant activity for cultivation of Mangifera species. Besides that, the result from antioxidant assay may be taken as an initial step to search for specific all agents for further applications. Many researchers are discovering new application and interested of beneficial by-product and contribute a positive environmental impact.

4 METHODOLOGY/TECHNIQUE

Plant collection and extractions

The leaves of *Mangifera indica* L. cv. Apple were collected in May, 2019 from Section 9, Bandar Baru Bangi, Selangor, Malaysia. The leaves of the plant were cleaned and washed. Then, the leaves were air-dried at a room temperature for seven days and cut into smaller pieces to make it easier for it to be grinded to produce fine powder sample. The grinded leaves (320 g) was successively extracted with n-hexane, ethyl acetate and methanol (1500 mL for each) for 3 days at room temperature in an orbital shaker [7]. The extracts were filtered and

concentrated under reduced pressure using rotary evaporator. The dried extracts were stored in a refrigerator until use [8].

Phytochemical screening

The leaves extracts were subjected to phytochemical screening for the detection of alkaloids, flavonoids, phenols, steroids, tannins, terpenoids, saponins, reducing sugars, coumarins and quinones using the standard qualitative procedures [9, 10, 11, 12].

Total Phenolic Content

The TPC were determined by Follin-Ciocalteu method with minor modification [13]. The absorbance was be measured at 765 nm using UV/Vis spectrophotometer against blank sample (methanol). The calibration curve was be plotted by preparing gallic acid and it was expressed as mg Gallic acid equivalent (GAE)/g of the extract. The analysis was done in triplicate and TPC value was reported as means ± SD of triplicates.

Antioxidant activity

DPPH radical scavenging activity of leaves extracts was estimated as method described [14] with slightly modifications. A 3.8 mL of 50 µM DPPH methanol solution (2.4 mg/120 mL) was added in 0.2 mL of sample solution in different concentrations and left in dark room for 30 minutes. The reaction mixture was measured at 517 nm by using UV-Visible Spectrophotometer and methanol was used as blank. The ascorbic acid was used as positive standard. The percentage of scavenging was calculated as follows:

$$\% \text{ Inhibition DPPH} = \left[\frac{A_{\text{DPPH blank}} - (A_{\text{sample}} - A_{\text{blank sample}})}{A_{\text{DPPH blank}}}\right] \times 100$$

All tests were performed in triplicate. Mean ± SD of triplicates was reported as IC_{50} values. Concentration of samples resulting in 50% inhibition on DPPH (IC_{50} value) was determined by using Graphpad prism 6 software [15].

5 RESULT

The result obtained for the qualitative screening of phytochemical of crude extracts in the leaves of *M. indica* L. cv. Apple were depicted in Table 5.1. This study also confirms the use of organic polar solvent (methanol) in the preparation of leaves extract to yield better results as compared to n-hexane and ethyl acetate extracts. It revealed the methanol extracts in leaves of *M. indica* L. cv. Apple are presence the higher group of phytochemical compounds.

Table 5.1: Phytochemical screening of various extracts leaves of *M. indica* L. cv. Apple

Phytochemicals	Extracts		
	n-hexane	Ethyl acetate	Methanol
Flavanoids	-	-	+
Phenols	-	+	+
Tannins	-	+	+
Terpenoids	+	+	+
Alkaloids	+	+	+
Reducing sugar	-	+	+
Steroids	+	+	+
Saponnins	-	-	+
Coumarin	+	-	+
Quinones	-	-	+

+: present; -: absent

Based on Table 5.2 the methanol leaves extract was showed significantly high value of TPC (4.427±0.019 mg GAE/g) and lower DPPH radical scavenging with IC_{50} value 64.89 µg/ml. The extract of methanol showed higher scavenger activity of solvent used. In contrast, *n*-hexane was showed weak antioxidant capacity because does not show scavenger activity due to no phenolic content.

Table 5.2: Total phenolic content and IC_{50} values of DPPH radical on crude extracts of *M. indica* L. cv. Apple for leaves

Solvents	**TPC (mg GAE/g extract)**	**IC_{50} (µg/mL)**
n-hexane	1.531±0.003	ND
Ethyl acetate	3.216±0.022	174.90 ± 0.754
Methanol	4.427±0.019	64.89 ± 0.930
Ascorbic acid	-	20.09 ± 0.508

ND = not determined.

6 CONCLUSIONS

In this study, the assessment obtained was showed that the leaves methanolic extracts of *Mangifera indica* L. cv. Apple contains various classes of phytochemical constituents and a significant source of natural antioxidants. However, further investigations are required to isolate and identify the unknown compounds responsible for their antioxidant activities and their mechanism of action is necessary to better understand their ability to control diseases that have a significant impact on quality of life.

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